Claims:

1. A method for identifying a filamentous organism of the type present in a biological waste water treatment process, comprising the steps of:

(a) obtaining a magnified image of the filamentous organism to be identified;

(b) evaluating the magnified image for the presence or absence of attached growth and the presence or absence of sulfur granules, wherein the attached growth comprises bacterial growth which is attached to a sheath of the filamentous organism; and

(c) executing a computer program which, for each combination of the presence or absence of attached growth and the presence or absence of sulfur granules, provides a separate user interactive search tree, each search tree leading to a different set of possible types of filamentous organisms.

2. The method of claim 1, wherein step (c) comprises identifying the filamentous organism as type 0914, using the search tree associated with the combination of the presence of attached growth and the presence of sulfur granules.

3. The method of claim 1, wherein step (c) comprises identifying the filamentous organism as a selected one of the following types: 0914, 021N, *Beggiatoa*, *Thiothrix I* or *Thiothrix II*, using the search tree associated with the combination of the absence of attached growth and the presence of sulfur granules.

4. The method of claim 3, wherein step (c) further comprises evaluating the filamentous organism for the presence or absence of at least one of the following physical characteristics: square sulfur granules, rectangular

granules, motility, a sheath, and variable cell morphology.

5. The method of claim 1, wherein step (c) comprises identifying the filamentous organism as a selected one of the following types: 0041, 0675, 0914, 1701, 1851, *H. Hydrossis* or *S. Natans*, using the search tree associated with the combination of the presence of attached growth and the absence of sulfur granules.

6. The method of claim 5, wherein step (c) further comprises evaluating the filamentous organism for the presence or absence of at least one of the following physical characteristics: sparse and perpendicular growth, square sulfur granules, branching, straightness, rod-shaped cells, and trichome diameter.

7. The method of claim 1, wherein step (c) comprises identifying the filamentous organism as a selected one of the following types:0041, 0092, 021N, 0411, 0581, 0675, 0803, 0914, 0961, 1701, 1851, 1863, *Beggiatoa, Flexibacter, H. Hydrossis, Limicola I, Limicola II, Limicola III, M. Parvicella, Nocardia ssp., S. Natans, Thiothrix I* or *Thiothrix II*, using the search tree associated with the combination of the absence of attached growth and the absence of sulfur granules.

8. The method of claim 7, wherein step (c) further comprises evaluating the filamentous organism for the presence or absence of at least one of the following physical characteristics: transparency, branching, motility, straight filament, straightness, oval cells, and trichome bundles.

9. The method of claim 8, wherein step (c) further comprises performing a Neisser stain of the filamentous organism.

10. The method of claim 8, wherein step (c) further comprises

performing a Gram stain of the filamentous organism.

11. A system for identifying a filamentous organism present in a biological waste water treatment process, comprising:

a computer with associated programming to provide a separate user interactive search tree for each combination of presence or absence of attached growth and presence or absence of sulfur granules in a magnified image of the filamentous organism, wherein the attached growth comprises bacterial growth which is attached to a sheath of the filamentous organism, and wherein each search tree leads to a different set of possible types of filamentous organisms.

12. The system of claim 11, wherein the computer is further provided with an associated video display and wherein the associated programming displays representative digital images of each of the combinations of the presence or absence of attached growth and the presence or absence of sulfur granules.

13. The system of claim 12, further comprising a microscope which generates the magnified image of the filamentous organism, and wherein the magnified image of the filamentous organism is displayed on the video display of the computer while the video display also displays the representative digital images of each of the combinations of the presence or absence of attached growth and the presence or absence of sulfur granules.

14. The system of claim 11, wherein the search tree associated with the combination of the presence of attached growth and the presence of sulfur granules results in the identification of the filamentous organism as type 0914.

15. The system of claim 11, wherein the search tree associated with

the combination of the absence of attached growth and the presence of sulfur granules results in the identification of the filamentous organism as a selected one of the following types: 0914, 021N, *Beggiatoa, Thiothrix I* or *Thiothrix II.*

16. The system of claim 11, wherein the search tree associated with the combination of the presence of attached growth and the absence of sulfur granules leads to the identification of the filamentous organism as a selected one of the following types: 0041, 0675, 0914, 1701, 1851, *H. Hydrossis* or *S. Natans.*

17. The system of claim 11, wherein the search tree associated with the combination of the absence of attached growth and the absence of sulfur granules leads to the identification of the filamentous organism as a selected one of the following types: 0041, 0092, 021N, 0411, 0581, 0675, 0803, 0914, 0961, 1701, 1851, 1863, *Beggiatoa, Flexibacter, H. Hydrossis, Limicola I, Limicola II, Limicola III, M. Parvicella, Nocardia ssp., S. Natans, Thiothrix I* or *Thiothrix II.*